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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,603	10/03/2003	Eric B. Cummings	33531/US	6147

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EXAMINER	
FICK, ANTHONY D	
ART UNIT	**PAPER NUMBER**
1753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/678,603	CUMMINGS ET AL.	
	Examiner	Art Unit	
	Anthony Fick	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22 and 24-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 24-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/26/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 15, 2007 has been entered.

Remarks

2. Applicant's amendments to the specification have overcome the previous objections. Applicant's arguments regarding the provisional statutory double patenting rejections were also persuasive and the rejections are withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Washizu et al. (U.S. 6,875,329).

Washizu discloses a dielectrophoresis device as shown in figure 17.

Regarding claim 1, the device of Washizu consists of a substrate or base plate, a plurality of electrodes positioned for dielectrophoresis, and a hollow space in the substrate (column 10, paragraphs 1, 4, and 5, and figure 17). Since a valley is a "negative ridge" in the definition of the applicant, the hollow space, 4, is an insulating ridge positioned such that sample may pass over the ridge. Figure 17 further shows a plurality of electrodes spaced away from the ridge (electrodes marked with a 3, plus any of the other electrodes not right next to the ridge 4). The claim limitation "to generate a spatially non-uniform electric field across the insulating ridge" is a process limitation and does not add any further structure to the claim. Thus the device of Washizu meets all the structural limitations of the claim and is deemed to be anticipatory. Further, it is the position of the examiner that the electrodes within figure 17 that are spaced away from the ridge are capable of generating a spatially non-uniform electric field across the ridge.

Regarding claim 28, figure 17 shows the ridge is a negative ridge.

5. Claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Austin et al. (U.S. 6,824,664).

Austin discloses an apparatus for electrode-less dielectrophoresis as shown in figures 1E and 1F.

Regarding claim 1, the device comprises a substrate, 14, an insulating ridge on the substrate, 12, and a plurality of electrodes spaced away from the ridge to generate a spatially non-uniform electric field across the ridge, 28a and 28b (see figures 1A and 1E).

Regarding claim 2, figures 8 and 9 show a plurality of insulating ridges.

Regarding claims 3 and 4, Austin discloses the substrate comprises glass or polymer (column 5, lines 37-44).

Regarding claim 6, Austin discloses a voltage source, 25, is connected to the plurality of electrodes (column 7, line 66 – column 8, line 20).

Regarding claim 7, Austin discloses the device where the insulating ridges are formed on a wall of a channel or chamber (column 12, lines 5-26).

Regarding claim 8, Austin discloses the device further comprises a fluid port (22 and 30) connected to the channel or chamber (column 10, lines 37-49).

Regarding claim 9, figure 9 shows second fluid channels connected to the first fluid channel, 131 – 141.

Regarding claim 17, Austin discloses the spatially non-uniform electric field exerts a dielectrophoretic force on at least one of the particles (see figures 3A-3D and column 12, line 40 – column 13, line 18).

Regarding claim 18, Austin discloses the particles are selected from the group consisting of bacteria, cells and viruses (column 11, lines 13-35).

Regarding claims 27, 31 and 32, figures 1D, 1E and 8 show a positive ridge and the electrodes being sufficiently far away such that the ridge geometry generates the non-uniform electric field.

Regarding claim 19, Austin also discloses a method for manipulating particles using dielectrophoresis (column 4, lines 43-55), the method comprising generating a spatially non-uniform electric field across an insulating ridge (column 18, lines 7-10),

passing a sample fluid containing the particles over the insulating ridge (column 17, lines 30-33 and column 18, lines 1-6), the spatially non-uniform electric field exerting a dielectrophoretic force on the particles thereby constraining the motion of at least one particle (column 17, lines 32-38), exerting a mobilization force on at least the constrained particle and transporting the particle along the ridge utilizing the mobilization force (column 18, paragraph 1).

Regarding claims 20, 21 and 22, Austin discloses the use of electrokinetic force, advection and gravitational forces since the particles are within a gravitational field (column 18, paragraph 1 and column 10, lines 37-49).

Regarding claim 25, figure 9 shows concentration areas that the particles are transported to (collection regions 131-141, see column 18, paragraph 1).

Regarding claim 26, Austin further discloses the method of generating a spatially non-uniform electric field across a plurality of ridges including a first and second ridge, thereby constraining the motion of a particle to a region adjacent to the first ridge (column 17, lines 32-48), changing the spatially non-uniform field such that the dielectrophoretic force on the first particle is decreased and transporting the first particle to the second ridge (column 17, lines 38-48 and column 18, lines 7-47).

Regarding claim 29, the figures show the ridge is a positive ridge.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Austin as applied to claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32 above, and further in view of Christel et al. (U.S. 6,368,871).

The disclosure of Austin is as stated above for claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32.

The difference between Austin and claim 5 is the requirement of insulating material being supported by a non-insulating material.

Christel teaches insulating features comprising an insulating material supported by a non-insulating material (column 7, lines 49-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the non-insulating material to support the insulating material as in Christel within the device of Austin because the non-insulating support helps create a capacitance structure with a surface that is non-conductive and therefore can be used for the extraction, purification and concentration of nucleic acids from a complex biological sample (Christel column 7, lines 53-57). Because Christel and Austin are concerned with biological samples, one would have a reasonable expectation of success from the combination. Thus the combination meets the claim.

8. Claims 10 through 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin as applied to claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32 above, and further in view of Iida et al. (U.S. 6,881,315).

The disclosure of Austin is as stated above for claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32.

The difference between Austin and the claims is the requirement for specific angled configurations of the ridges.

Iida teaches a microfluidic device with insulative ridges useful for separating out species in a sample solution. Iida further teaches the insulative ridges can have a variety of shapes like a cone, pyramid or frustrum (column 5, paragraph 1) and the various sets of ridges can have the same or different shapes.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the various shaped ridges of Iida within the device of Austin because the shaped ridges helps prevent clogging of the device. Further selection of a specific shape would be a design choice that is optimized for the specific application. The different shapes result in different angles with respect to the flow direction as required by the claims. Therefore, the choices of different angles are obvious over the prior art.

9. Claims 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin as applied to claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32 above, and further in view of Washizu et al. (U.S. 6,875,329).

The disclosure of Austin is as stated above for claims 1 through 4, 6 through 9, 17 through 22, 25 through 27, 29, 31 and 32.

The difference between Austin and the claims is the requirement of a negative insulative ridge.

Washizu teaches a method for separating substances using dielectrophoresis. The device of Washizu consists of a substrate or base plate, a plurality of electrodes positioned for dielectrophoresis, and a hollow space in the substrate or negative ridge (column 10, paragraphs 1, 4, and 5, and figure 17).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the negative insulative ridges of Washizu within the device and method of Austin because the negative ridges allows a negative dielectrophoretic force to concentrate particles in the area around the ridge (Washizu abstract). Because Washizu and Austin are both concerned with dielectrophoretic separations, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1 through 6, 17 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6, 7, 8, 10 and 11 of copending Application No. 10/760,139. Although the conflicting claims are not identical, they are not patentably distinct from each other because the device of the copending application meets all the presently claimed requirements (see copending claims 1, 6, 7, 10 and 11).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

12. Applicant's arguments filed February 15, 2007 in reference to claim 1 and the Washizu reference have been fully considered but they are not persuasive. Applicant argues that the claim amendments distinguishes claim 1 from Washizu. The examiner respectfully disagrees. As stated above, figure 17 shows a plurality of electrodes spaced away from the ridge (electrodes marked with a 3, plus any of the other electrodes not right next to the ridge 4). Therefore there are a plurality of electrodes spaced away from the ridge as required by the claim. As the device of Washizu meets all the structural elements of the claim, the rejection is maintained.

13. Applicant's arguments with respect to claims 2 through 22 and 24 through 26 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday - Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick ADF
AU 1753
May 11, 2007

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